



OA3

## VOLTAGE REGULATOR

GLOW-DISCHARGE TYPE

OA3

## GENERAL DATA

## Electrical:

Cathode . . . . . Cold

## Mechanical:

Mounting Position . . . . . Any

Maximum Overall Length . . . . . 4-1/8"

Seated Length . . . . . 3-3/8"  $\pm$  3/16" ←

Maximum Diameter . . . . . 1-9/16" ←

Dimensional Outline . . . . . See General Section

Weight (Approx.) . . . . . 1.3 oz ←

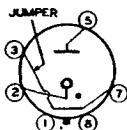
Bulb . . . . . ST-12 ←

Base . . . . . Small-Shell Octal 6-Pin (JETEC No. B6-3) ←

Basing Designation for BOTTOM VIEW . . . . . 4A1

Pin 1 - No Connection

Pin 2 - Cathode

Pin 3 - Jumper<sup>▲</sup>

Pin 5 - Anode

Pin 7 - Jumper<sup>▲</sup>

Pin 8 - No Connection

## Maximum and Minimum Ratings, Absolute Values:

AVERAGE STARTING CURRENT<sup>◆</sup> . . . . . 100 max. ma

DC CATHODE CURRENT . . . . . { 40 max. ma

. . . . . { 5 min. ma

FREQUENCY . . . . . 0 max. cps ←

AMBIENT-TEMPERATURE RANGE . . . . . -55 to +90 °C

## Circuit Values:

Shunt Capacitor . . . . . 0.1 max.  $\mu$ f

Series Resistor . . . . . See Operating Considerations

## CHARACTERISTICS RANGE VALUES FOR EQUIPMENT DESIGN

|                                  | Min.             | Av. | Max.             |       |
|----------------------------------|------------------|-----|------------------|-------|
| DC Anode-Supply Voltage . . . .  | 105 <sup>■</sup> | -   | -                | volts |
| Anode Breakdown Voltage . . . .  | -                | 100 | 105 <sup>*</sup> | volts |
| Anode Voltage Drop . . . . .     | 68 <sup>●</sup>  | 75  | 85 <sup>*</sup>  | volts |
| Regulation(5 to 40 ma) . . . . . | -                | 5   | 6.5 <sup>*</sup> | volts |

<sup>▲</sup> With suitable socket connections, jumper within base acts as a switch to open power-supply circuit when voltage regulator tube is removed from socket.

<sup>◆</sup> Averaged over starting period not exceeding 10 seconds. This starting period must be followed by a steady-state operating condition of at least 20 minutes, or tube performance will be impaired.

<sup>■</sup> Not less than indicated supply voltage should be provided to insure "starting" throughout tube life.

<sup>\*</sup> Maximum individual tube value during useful life.

<sup>●</sup> Minimum individual tube value during useful life.

← Indicates a change.



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### OPERATING CONSIDERATIONS

Sufficient resistance must always be used in series with the OA3 to limit the current through the tube. The value for the series resistor is dependent on the maximum anode-supply voltage and the ratio of the current through the load to the operating current of the OA3, and should be chosen to limit the operating current through the tube to 40 milliamperes at all times after the starting period.

The maximum load current that can be regulated by the OA3 is determined by the minimum and maximum values of the supply voltage. After the value of series resistor for the maximum supply voltage has been calculated as indicated above, it is then in order to determine if this value will permit adequate starting voltage when the supply voltage falls to its minimum value. If adequate starting voltage is not obtained, a new load current of lower value must be used and the calculations repeated. It will be apparent from such calculations that the higher the minimum supply voltage and the smaller the difference between its minimum and maximum values, the higher will be the load current that can be regulated.

When equipment utilizing the OA3 is "turned on", a starting current in excess of the average operating current is permissible as indicated under Maximum Ratings. When the tube is subjected to such high starting currents, the regulated voltage may require up to 20 minutes to drop to its normal operating value. This performance is characteristic of voltage-regulator tubes of the glow-discharge type. Similarly, the regulation is affected by changes in current within the operating-current range. For example, the regulation of a tube operated for a protracted period at 5 milliamperes and then changed to 35 milliamperes, may be somewhat different from the value that will be obtained after a long period of operation at 35 milliamperes. Likewise, the regulation may change somewhat after a long idle period.

In order to handle more load current, two or more OA3's may be operated in parallel, but such parallel operation requires that a resistance of approximately 100 ohms be used in series with each OA3 in order to equalize division of the current between the paralleled tubes. The disadvantage of this method, of course, is that the use of resistors impairs the regulation which can be obtained.

If the associated circuit has a capacitor in shunt with the OA3, the capacitor should be limited in value to 0.1  $\mu$ f. A larger value may cause the OA3 to oscillate and thus give unstable regulation performance.

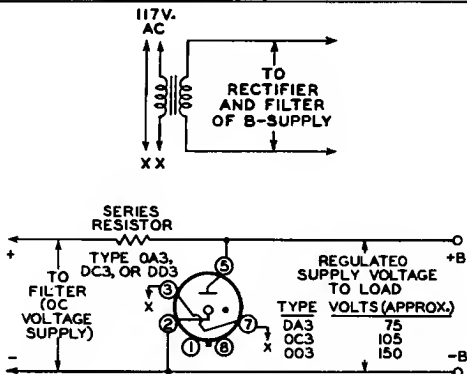
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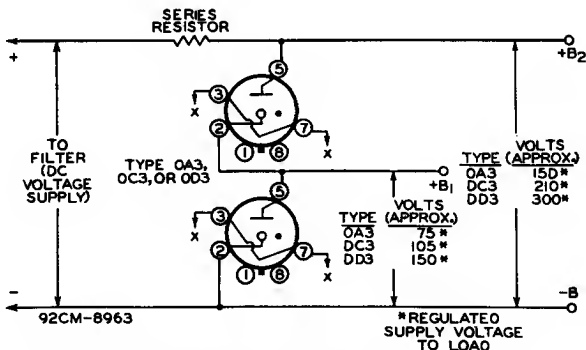
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Typical circuit to provide regulated supply voltage of approximately 75, 105, or 150 volts to load. Removal of tube from socket removes voltage from load.



Typical circuit using two OA3's, two OC3's, or two OD3's to provide regulated supply voltages of approximately 150, 210, or 300 volts and 75, 105, or 150 volts to load. Socket connections are so made that voltage on load is removed when either tube is taken from its socket.

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